

### REMARKS/ARGUMENTS

Favorable reconsideration of the present application is respectfully requested.

The restriction requirement previously made in the Official Action dated July 1, 2003, has been repeated and has been made final. Applicants continue to maintain that certain features of the claims in the two groups have sufficient commonality that a restriction requirement is improper. Claims 9-17 have herein been identified as being withdrawn. The examiner is urged to rejoin Claims 9-17 with Claims 1-8, in the further examination of this application.

Claim 4 was rejected under 35 USC §112, second paragraph, as being indefinite. The basis for the rejection is not fully understood. The claim recites that the area of the shade pattern is smaller than the area (light transmission region) having no shade pattern. The objection appears to be that FIG. 1B, element 2, evidences that the area of the shade pattern can be either larger or smaller than the area having no shade pattern. Applicants note that Claim 1, from which Claim 4 depends, does not recite the relative sizes of the areas of the shade pattern and the light transmission region. As such, Claim 1 is sufficiently broad to cover both constructions. Claim 4 is intended to recite only one of the constructions. Applicants do not see how this would lead to a problem with indefiniteness.

Withdrawal of the rejection of Claim 4 under 35 USC §112, second paragraph, is respectfully requested. If Applicants have misunderstood the basis for this rejection, the Examiner is invited to initiate a telephonic interview in order to discuss the rejection, and to hopefully arrive at a resolution to the issue.

Claim 1 has initially been rejected under 35 USC §103(a) as being unpatentable over the Hatakeyama et al. patent (U.S. 6,007,969). The Official Action asserts that Hatakeyama discloses the claimed method, with the exception of selecting

a photomask made with nano particles. It is further asserted that it would have been obvious to produce a photomask made of nano particles in light of the disclosure in Hatakeyama of using nano particles for shielding. Applicants believe that Claim 1, as currently presented, patentably defines the invention over the Hatakeyama disclosure.

The Hatakeyama patent does disclose, as prior art, a conventional photolithography process employing a photomask. Separately, in discussing the process disclosed therein, Hatakeyama sets forth that nano-sized particles can be used in an energy-beam assisted microfabrication etching process, in order to form patterns in a substrate. Notably, the prior art photolithography process, and, in particular, the use of a photomask, are completely done away with in Hatakeyama, when the approach therein turns its focus to the use of micro-particles and nano particles. Hatakeyama expressly states that, “[T]he method... makes it possible to produce fine structures which were not possible within the scope of conventional fabrication methods based on photolithographic techniques.” (Col. 2, line 64 – Col. 3, line 2)

The method proposed in Hatakeyama does not involve the use of a photomask, as is claimed in Claim 1 herein. Hatakeyama proposes a direct etching approach, in which micro-or nano-particles are deposited directly on the substrate to be etched. A fast atomic beam (FAB) is used to etch the surface of the substrate, with the micro- or nano-particles being used to shield the substrate from the effects of the FAB. The micro- or nano – particles themselves are also may be etched away as seen, for example, in FIGS. 3A-3E.

In any event, nothing in the Hatakeyama patent discloses or suggests a process in which nano particles are employed to form shade patterns on a photomask. Indeed, Hatakeyama abandons the concept of using photomasks and photolithography, once the other processes involving a distribution of particles directly onto the surface to be

etched is contemplated. As such, Hatakeyama is seen as leading persons of ordinary skill in the art away from using nano particles in forming photomasks.

Claim 1 of the present invention, in contrast, recites a process for forming the wiring of a wiring substrate using a photomask comprising a plate on which a shade pattern containing nano particles and a binder is formed. New Claim 18 further recites that this plate is a glass plate. Hatakeyama discloses nothing regarding forming a photomask in which the shade patterns include the use of nano particles. As noted above, Hatakeyama moves completely away from processes involving photomasks, instead concentrating on the use of an FAB and employing shielding elements such as micro- or nano particles directly on the surface to be etched. This does nothing to suggest the suitability of nano particles held in a binder for use as shade patterns on a photomask, as claimed. Only in the present specification is it noted that the use of nonoparticles in a binder material may be advantageously be used as a shade pattern which will scatter and/or absorb light sufficiently to be used on a photomask in forming the wiring of a wiring substrate.

Claim 1 as currently presented is thus believed to be patentable over the cited Hatakeyama patent. New Claim 18, which depends from Claim 1 and recites that the plate of the photomask is a glass plate, is also not rendered obvious by the Hatakeyama patent. Withdrawal of the rejection of Claim 1 under 35 USC §103(a) in view of Hatakeyama is therefore respectfully requested.

Claims 2 and 6 have initially been rejected under 35 USC 103(c) in view of the teachings of Hatakeyama and May et al. (U.S. 4,465,749). The May patent is directed to a considerably different process than is the Hatakeyama process, and, as such, the teachings therein would not be looked to by persons of ordinary skill in the art who might be exploring further developments in the Hatakeyama process. The

May patent is directed to enhancing image production in an electrostatic imaging process.

Referring to Column 2 of the May patent cited by the Official Action, the discussion in May of the use of a toner as a mask appears to involve a discussion only of a prior art design. May appears to be stating that processes involving the use of a tower as a mask for a later photoexcitation are disadvantageous compared to a process in which imaging involves only a single charging and exposure step. Further, in describing the May invention, at Column 2, lines 33-39, step (c) of the May process is stated to be conducted, “under conditions in which the nontoned regions of the charge-holding layer are not photoexcited ...”. (emphasis added) This suggests that the May process will not involve using the toner as a mask. As a result, the discussion of toner characteristics and compositions cited in the Official Action (Columns 6 and 12 of May) do not appear to be relevant to the characteristics or composition of a mask, or a shade pattern for a mask.

At a more basic level, the May patent further does not contain any disclosure that would lead a person of ordinary skill in the art to employ nano particles as disclosed in Hatakeyama in forming a photomask for producing a wiring substrate. Thus, withdrawal of the rejection of Claims 2 and 6 under 35 USC §103(a) in view of Hatakeyama and May, is respectfully requested.

Claims 3, 4 and 5 have initially been rejected under 35 USC §103(a) in view of Hatakeyama and a patent to Takahiro et al. (JP 05-289307). The Takahiro reference, while disclosing a photosensitive film or resist pattern 12, does not disclose or suggest the use or the possible suitability of use of nano particles in forming a shade pattern. The Hatakeyama patent, as discussed previously, also does not disclose or suggest this aspect of the present invention. Further, as the Hatakeyama

process dispenses with the use of a photomask, the teachings of Takahiro would not be looked to by persons of ordinary skill in the art who might be exploring the further development of the process disclosed as the invention in Hatakeyama.

Reconsideration and withdrawal of the rejection of Claims 3-5 under 35 USC §103(a) is therefore respectfully requested.


Claims 7 and 8 have initially been rejected under 35 USC §103(c) as being unpatentable over Hatakeyama and Takahiro, and further in view of Kunimichi et al. (JP09-321184). Kunimichi does not disclose or suggest the aspects of the claimed invention discussed above as being absent from the Hatakeyama and Kunimichi references. None of these references discloses or suggests to the person of ordinary skill in the art that a wiring of a wiring substrate can be produced by using an exposure through a photomask in which the photomask has a shade pattern formed on a plate, and in which the shade pattern contains nano particles (to scatter light) and a binder. Withdrawal of the rejection of Claims 7 and 8 under 35 USC §103(a) is therefore warranted, and is respectfully requested.

In view of the foregoing, Applicants believe that all claims as currently presented are allowable over the cited references, and are, in all other respects, in condition for allowance. Reconsideration and withdrawal of all objections and rejections is respectfully requested. Passage of the application to issue at an early date is earnestly solicited.

Authorization is hereby given to charge any fee that is deemed to be owed as a result of the filing of this Amendment, to Deposit Account No. 501165. A duplicate copy of this paper is enclosed for deposit account charging purposes.

Respectfully,

MILES & STOCKBRIDGE P.C.

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